

Name:	Fire Behavior and Combustion
Course Description:	Explores the theories and fundamentals of how and why fires start, spread, and are controlled.
Prerequisite:	None
Outcomes:	<ol style="list-style-type: none"> 1. Identify physical properties of the three states of matter 2. Categorize the components of fire. 3. Recall the physical and chemical properties of fire. 4. Describe and apply the process of burning. 5. Define and use basic terms and concepts associated with the chemistry and dynamics of fire. 6. Describe the dynamics of fire. 7. Discuss the various materials and their relationship to fires as fuel. 8. Demonstrate knowledge of the characteristics of water as a fire suppression agent 9. Articulate other suppression agents and strategies. 10. Compare other methods and techniques of fire extinguishments.
References/Texts:	<p><i>NFPA Handbook</i> (CDROM licensing agreement available)</p> <p><i>Principles of Fire Protection Chemistry and Physics</i> Raymond Friedman, NFPA</p> <p><i>Principles of Fire Behavior</i>, James Quintiere: Delmar</p> <p><i>DOT Emergency Response Guidebook</i>, Department of Transportation</p> <p><i>DOT 11 Guide</i>, Department of Transportation</p> <p>Periodic Table of Elements</p>
Assessment:	Students will be evaluated for mastery of learning objectives by methods of evaluation to be determined by the instructor.
Points of Contact	<p>National Fire Science Curriculum Advisory Committee: Point of Contact(s) Gail Ownby-Hughes, Chattanooga State Tech Community College, Tennessee (423) 697-2583, ghughes@cstcc.cc.tn.us.</p> <p>Gary Kistner, San Antonio Community College, Texas (210)733-3884, gkistner@accdvm.accd.edu</p>

Course Content
Fire Behavior and Combustion

- I. Introduction
 - A. Matter & Energy
 - B. The Atom and its Parts
 - C. Chemical Symbols
 - D. Molecules
 - E. Energy and Work
 - F. Forms of Energy
 - G. Transformation of Energy
 - H. Laws of Energy
- II. Units of Measurements
 - A. International (SI) Systems of Measurement
 - B. English Units of Measurement
- III. Chemical Reactions
 - A. Physical States of Matter
 - B. Compounds and Mixtures
 - C. Solutions and Solvents
 - D. Process of Reactions
- IV. Fire and the Physical World
 - A. Characteristics of Fire
 - B. Characteristics of Solids
 - C. Characteristics of Liquids
 - D. Characteristics of Gases
- V. Heat and its Effects
 - A. Production and Measurement of Heat
 - B. Different Kinds of Heat
- VI. Properties of Solids Materials
 - A. Common Combustible Solids
 - B. Plastic and Polymers
 - C. Combustible Metals
 - D. Combustible Dust
- VII. Common Flammable Liquids and Gases
 - A. Fire Characteristics
 - B. General Properties of Gases
 - C. The Gas Laws
 - D. Classification of Gases
 - E. Compressed Gases
- VIII. Fire Extinguishment
 - A. The Combustion Process

- B. The Character of Flame
 - C. Fire Extinguishment
- IX. Classification of Fire & Extinguishing Agents
 - A. Water
 - B. Portable Fire Extinguishers
 - C. Foams and their Types
 - D. Concentrate Proportioning Systems
 - E. Foam Generating Systems
- X. Gas and Halon Extinguishing Agents
 - A. Inert Gas Extinguishing Agents
 - B. Halogenated Extinguishing Agents
 - C. Dry Chemical Extinguishing Agents
 - D. Dry Powder Extinguishing Agents
- XI. Department of Transportation Hazard Classes
 - A. Nine Hazard Classes
 - B. Other Regulated Materials
 - C. Other Classifications of Hazardous Materials
- XII. Placarding
 - A. Department of Transportation Placards
 - B. Special Placard
 - C. Dangerous Placard
 - D. Weight Limitations
 - E. Incompatible Loads
- XIII. Introduction to Labeling
 - A. Department of Transportation Labels
 - B. Special Labels
 - C. Labels for ORM Materials
 - D. NFPA 704 System
- IX. Hazards of Chemicals
 - A. Hazards of Explosives
 - B. Hazards of Compressed and Liquefied Gases
 - C. Hazards of Flammable and Combustible Liquids
 - D. Hazards of Flammable Solids
 - E. Hazards of Oxidizing Agents
 - F. Hazards of Poisons
 - G. Hazards of Radioactive Substances
 - H. Hazards of Corrosives